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# Section 3

## Uintah Basin Plan

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### Utah State Water Plan

## Introduction

The *Uintah Basin Plan* covers all aspects of the basin's water resources and provides data for planning, conserving and developing water resources.

### 3.1 Background

This section presents planning principles and purposes and describes the organization and process for plan preparation. The physical aspects of the Uintah Basin are presented to provide a foundation for describing the water and water-related resources. Current statewide water planning was initiated in 1986 and resulted in the *State Water Plan* in January 1990.<sup>154</sup>

### 3.2 Planning Guidelines

The *State Water Plan* describes the basic premises and lays the foundation for state water planning. This insures continuity so individual basin plans will be consistent with the statewide plan and with each other.

#### 3.2.1 Principles

The principles, values, uses and interests considered when preparing a basin plan are:

- All waters, whether surface or subsurface, are held in trust by the state as public property, and their use is subject to rights administered by the State Engineer.
- Water is essential to life. It is our responsibility to maintain or improve water quality to meet the needs of generations to follow.
- The diverse present and future interests of Utah's residents should be protected through a balance of economic, social, aesthetic and ecological values.
- Water uses for which it is difficult to identify beneficiaries, such as recreation and aesthetics, should be included in program evaluation.
- Public participation is vital to water resources planning.
- All state residents are encouraged to practice water conservation and implement wise water use practices.
- Water rights owners are entitled to transfer their rights under free market conditions.
- Water resources projects should be technically, economically and environmentally sound.
- Water planning and management activities of local, state and federal agencies should be coordinated.
- Local governments, with appropriate state assistance, are responsible for protecting against emergency events such as floods and droughts.
- Designated water uses and quality should be improved or maintained unless there is evidence the loss is outweighed by other benefits.
- Educating Utahns about water and the state water rights system is essential. Effective planning and management require a broad-based citizen understanding of water's physical characteristics, potential uses and value.

### 3.2.2 Purpose

This basin plan will assist local, state, and federal agencies to coordinate water-related activities while providing a process to help local water entities prepare long-term water conservation and management plans. It includes current basic information to help in setting priorities. It addresses policy issues and, where appropriate, makes specific recommendations to resolve them. The *Uintah Basin Plan* will help accomplish the mission of the Division of Water Resources to promote the orderly and timely planning, conservation, development, utilization and protection of Utah's water resources to enhance the quality of life for the citizens of the state.

### 3.2.3 Organization

The Division of Water Resources carries out state water planning under direction of the Board of Water Resources. A state water plan coordinating



Split Canyon, Green River

committee, composed of state agencies with water-related missions, assisted in preparation of this plan. A steering committee consisting of the chair and vice-chair of the Board of Water Resources, the executive director of the Department of Natural Resources, and the director and assistant director of the Division of Water Resources provides policy, resolves issues and approves plans before acceptance by the board. A local board member is invited to participate with the steering committee. In addition,

other state and federal agencies which have expertise in various fields participate as cooperating agencies.

A local basin planning advisory group provides advice, review and decision-making. The group represents various local water interests and geographical areas within the basin.

### 3.2.4 Process

Four drafts of the *Uintah Basin Plan* were prepared for review and approval. They include: 1) in-house, 2) committee, 3) advisory, and 4) public review drafts. After the process is complete, the final basin plan is distributed to the public.

## 3.3 Basin Description

The Uintah Basin Planning Area, located in northeastern Utah, is shown in Figure 3-1. It includes all of Daggett, Duchesne and Uintah counties and parts of Carbon, Emery, Grand, Summit, Utah and Wasatch counties. The principal

drainage is the Green River, with the Duchesne and White rivers as major tributaries. The planning area covers 10,890 square miles (6,969,600 acres) and is divided into five sub-units: Upper Green, Ashley/Brush, Duchesne/Strawberry, and the Green and White areas (shown in Figure 3-2). Vernal, Roosevelt, Duchesne and Manila are the largest commercial centers in the planning area.

### 3.3.1 Drainage Area and Topography

The Uintah Basin is divided into two drainages -- the north slope and the south slope of the Uinta Mountains. The north slope is bounded by the Uinta Mountains to the south, the Wyoming border to the north, the Colorado border to the east, and the Bear River Basin to the west. The south slope is bounded by the Uinta Mountains to the north, the Tavaputs Plateau and the Book Cliffs to the south, Diamond Mountain and the Utah/ Colorado border to the east, and the Wasatch Range to the west. Elevations range from 13,528 feet at Kings Peak in the Uinta Mountains to 4,150 feet where the Green River exits the basin, just above its confluence with the Price River.

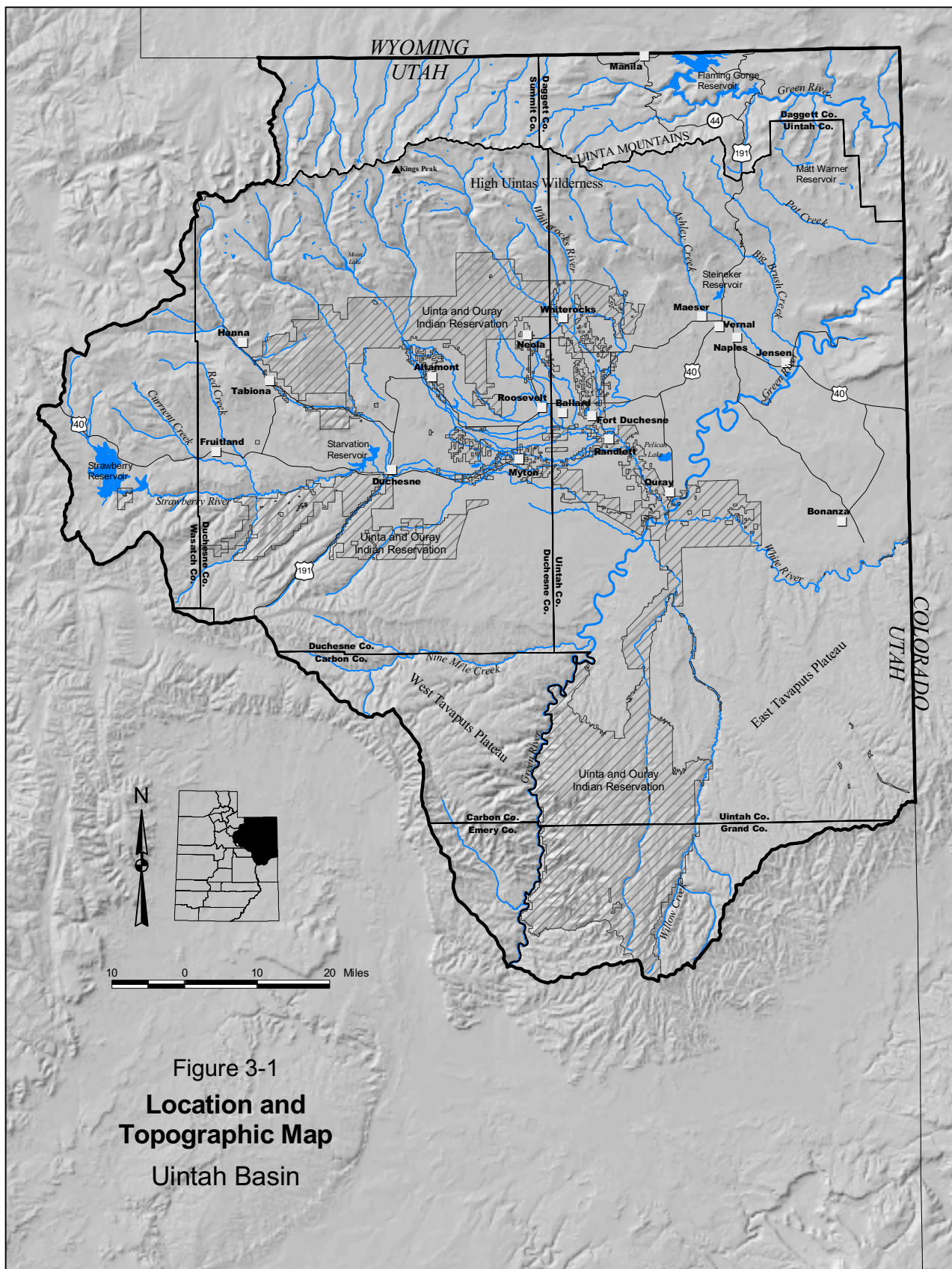


Figure 3-1  
**Location and  
 Topographic Map**  
 Uintah Basin

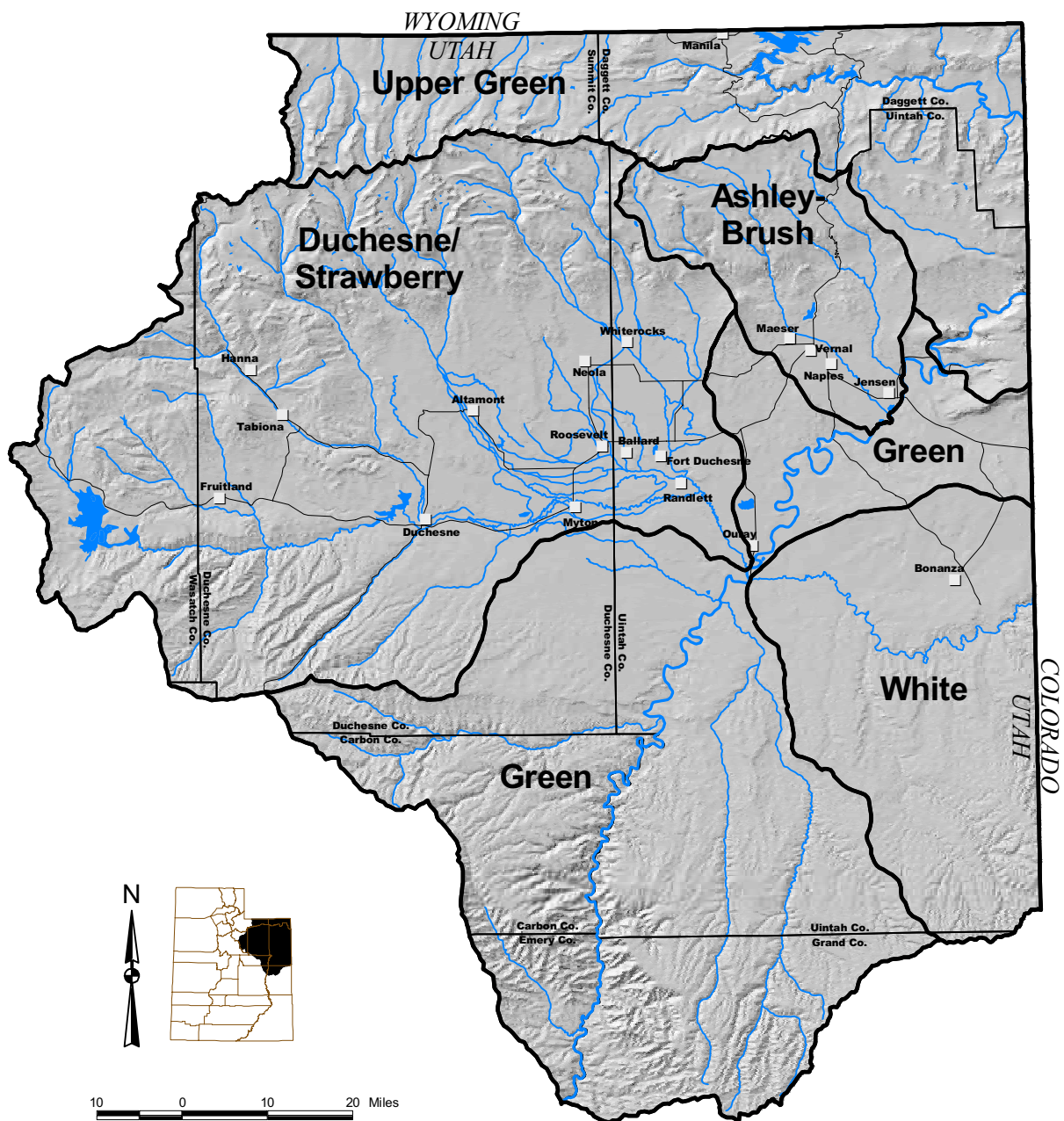


Figure 3-2  
**Hydrologic  
 Sub-Units**  
 Uintah Basin

The Green River drains the north slope of the Uinta Mountains, while the Duchesne River, its primary tributary, drains the south slope. The White River, also a tributary, drains the eastern Utah border area, along with part of Colorado.

The north slope of the Uinta Mountains has many small streams, such as Blacks Fork, Smiths Fork, Henrys Fork, Beaver Creek, Burnt Fork and Sheep Creek. Some of this water is used for irrigation and municipal and industrial purposes in Wyoming and Utah. The major south slope streams are Currant Creek, Red Creek, Rock Creek, and the Lake Fork, Yellowstone, Uinta, Whiterocks and Strawberry rivers which drain into the Duchesne River, which drains into the Green River. The Vernal area is drained by Dry Fork, Ashley and Brush creeks.

### 3.3.2 Climate<sup>147,169,73,34</sup>

Mean annual temperatures in the valleys range from 44° to 47° F. Mean monthly maximum temperatures reach 94.6° F in July, and the mean monthly minimum falls as low as 2.5° F in January. The number of frost-free days ranges from 134 at Roosevelt to 57 near Flaming Gorge (see Table 3-1). Mean annual precipitation ranges from 7.1 inches at Roosevelt to 12.5 inches at Flaming Gorge Reservoir. The Uinta Mountains receive about 40 inches. Figure 3-3 shows the climatological reporting stations, and Figure 3-4 shows annual precipitation.

### 3.3.3 Physiography and Geology<sup>78,47</sup>

The Uinta Mountain range is unique, being the only major range of mountains in North America running east and west. The Uintah Basin is comprised of two provinces; the Uinta Mountain section of the Rocky Mountain Province and the Uinta Basin section of the Colorado Plateau.

The Uinta Mountains are about 150 miles long and 30 miles wide. The broad, massive range was created by anticlinal uplifting, with sedimentary units outcropping on the flanks and dipping outward in all directions. During Pleistocene times, the Uinta

Mountains were extensively glaciated, and glacial features dominate the present landscape. Glacial erosion has created many picturesque examples of horns, aretes, cirques and glacial troughs.

Deposition by the ice and glacial-melt water has partially filled the many U-shaped valleys with ground moraine and valley trains. It has also lined them with lateral and terminal moraines that have often formed natural dams, creating over a thousand small lakes that dot the region.

### Duchesne/Strawberry Sub-Unit

The Duchesne/Strawberry sub-unit lies south of the Uinta Mountains. It is a synclinal topographical basin with an east-west axis running near the south flank of the Uinta Mountains. Elevations at the top of the Roan Cliffs at the southern rim are over 9,000 feet, while the basin floor near Roosevelt is about 5,000 feet in elevation. Although the central portion of the Duchesne/Strawberry Area is gently rolling, there are areas of deeply cut ravines.



Near Red Fleet Reservoir

The Duchesne/Strawberry sub-unit, even though it is considered a plateau, is dissected by many streams. The larger ones include the Duchesne River, Strawberry River, Rock Creek, Lake Fork, and the Yellowstone, Uinta and Whiterocks rivers.

**Table 3-1**  
**Mean Temperatures And Precipitation**

Station	January		July		Mean Annual (F°)	Frost-Free Days <sup>a</sup>	Annual Precipitation <sup>b</sup> (inches)
	Max. (F°)	Min. (F°)	Max. (F°)	Min. (F°)			
	(mean temperatures)						
Dinosaur Quarry	29.1	2.5	94.6	55.3	47.4	76	8.47
Duchesne	31.3	5.5	88.1	54.3	46.0	122	9.55
Flaming Gorge	34.6	8.7	85.6	50.4	44.0	57	12.5
Manila	36.0	10.0	87.0	52.0	--	121	9.68
Neola	30.1	6.5	84.6	54.3	44.5	122	8.73
Roosevelt	29.3	3.4	90.9	55.1	46.5	134	7.10
Vernal	28.1	4.9	90.0	53.4	45.5	123	8.16
Ouray	28.7	1.8	94.2	55.6	44.6	142	7.00

<sup>a</sup>Frost-free days are from average spring to first fall frost.

<sup>b</sup>All precipitation values are 1961-1990 normals.

Source: Utah Climate, 1992.

The plateau consists of smooth, gently sloping benches or mesas; alluvial valleys dissected by streams; alluvial fans and foothill slopes that lie between the bases of mesas and the valley plains; rolling uplands; and steep, rough, broken and eroded lands. These different types of relief are not confined to any specific locality, but are scattered throughout the planning area. The mesas and rolling uplands are more extensive in the northern part, and the valleys occur mainly in the eastern and central parts.

Most of the basin floor is between 5,000 and 6,000 feet above sea level; however, it drops to 4,645 feet just south of Ouray. The highest elevation at which crops are grown is about 7,000 feet above sea level, near Mountain Home. Most of the irrigated land occurs on the lower benches and mesas and in the alluvial valleys.

### **Green Sub-Unit**

The Green sub-unit consists of the Tavaputs Plateau and the Green River Valley.

South of the Duchesne River/White River drainages, the Tavaputs Plateau rises to the south with the dip of the Green River formation on which it is cut. The interstream divides are broad and

consist of a series of discontinuous cuestas upheld by local sandstones and indurated limey and siliceous zones. Streams and dry washes are deeply incised in canyons. The topography is rugged, with distances of half a mile to a mile between tributary drainages. The area is completely drained, and the largest streams, such as Indian Canyon Creek, Antelope Creek and Nine Mile Creek, are beginning to develop small floodplains along their lower courses. Even the largest streams are trickles at the bottom of canyons almost 1,000 feet deep. Flash floods produce most of the erosion.

The rocks of the Tavaputs Plateau are predominantly creamy to light gray in color, and those of the Upper Duchesne River Plateau are chiefly brick red. This color difference forms a boundary which coincides roughly with the physiographic boundary.

The valley of the Green River comprises a narrow physiographic feature that traverses the basin from northeast to southwest. It is in early maturity where it emerges from Split Mountain to the point five miles southwest of Ouray where it turns southward to transect the Tavaputs Plateau.

The Green sub-unit also contains the Minnie Maud, Argyle, Willow, Nine Mile and Range creeks.

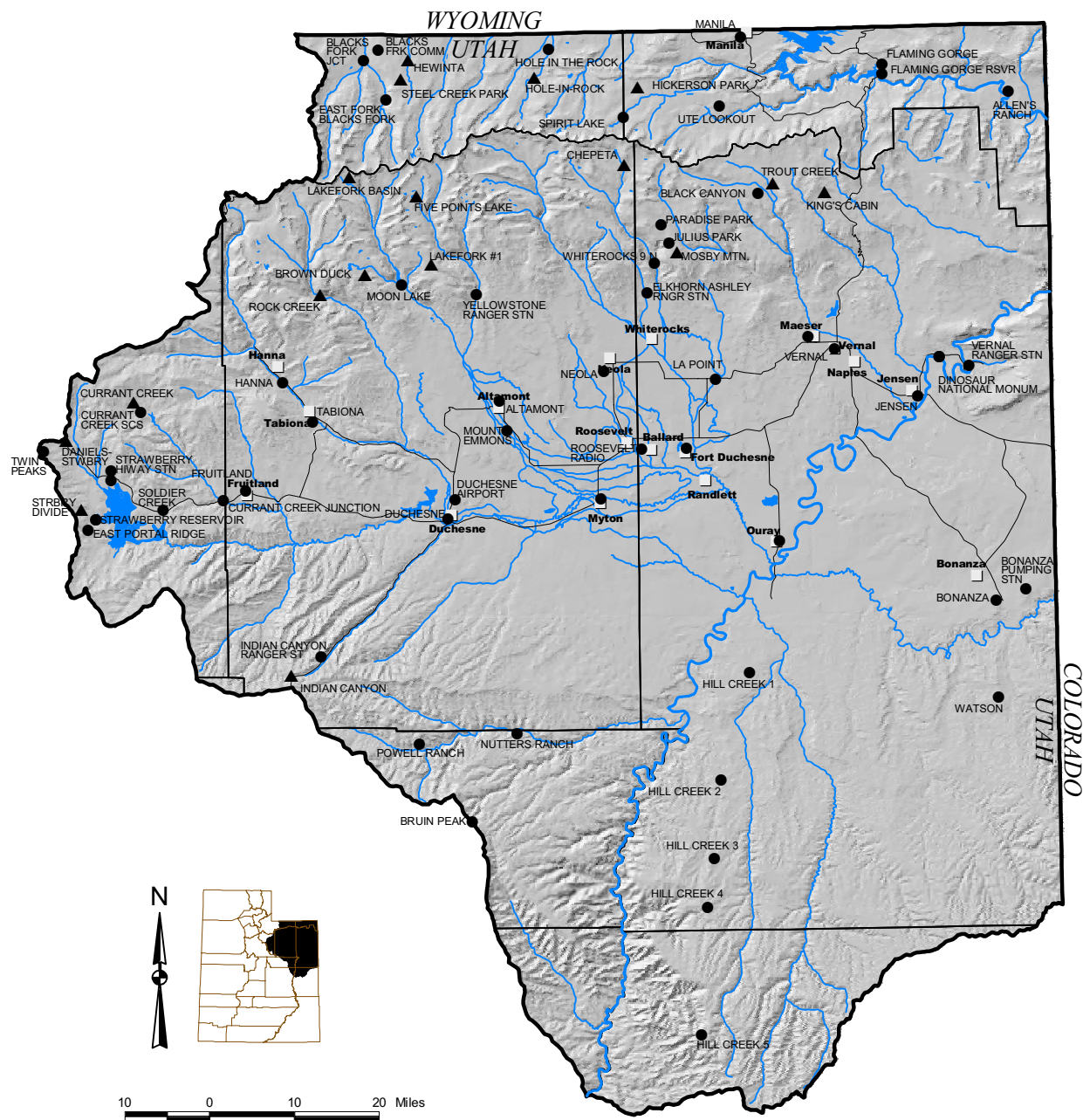
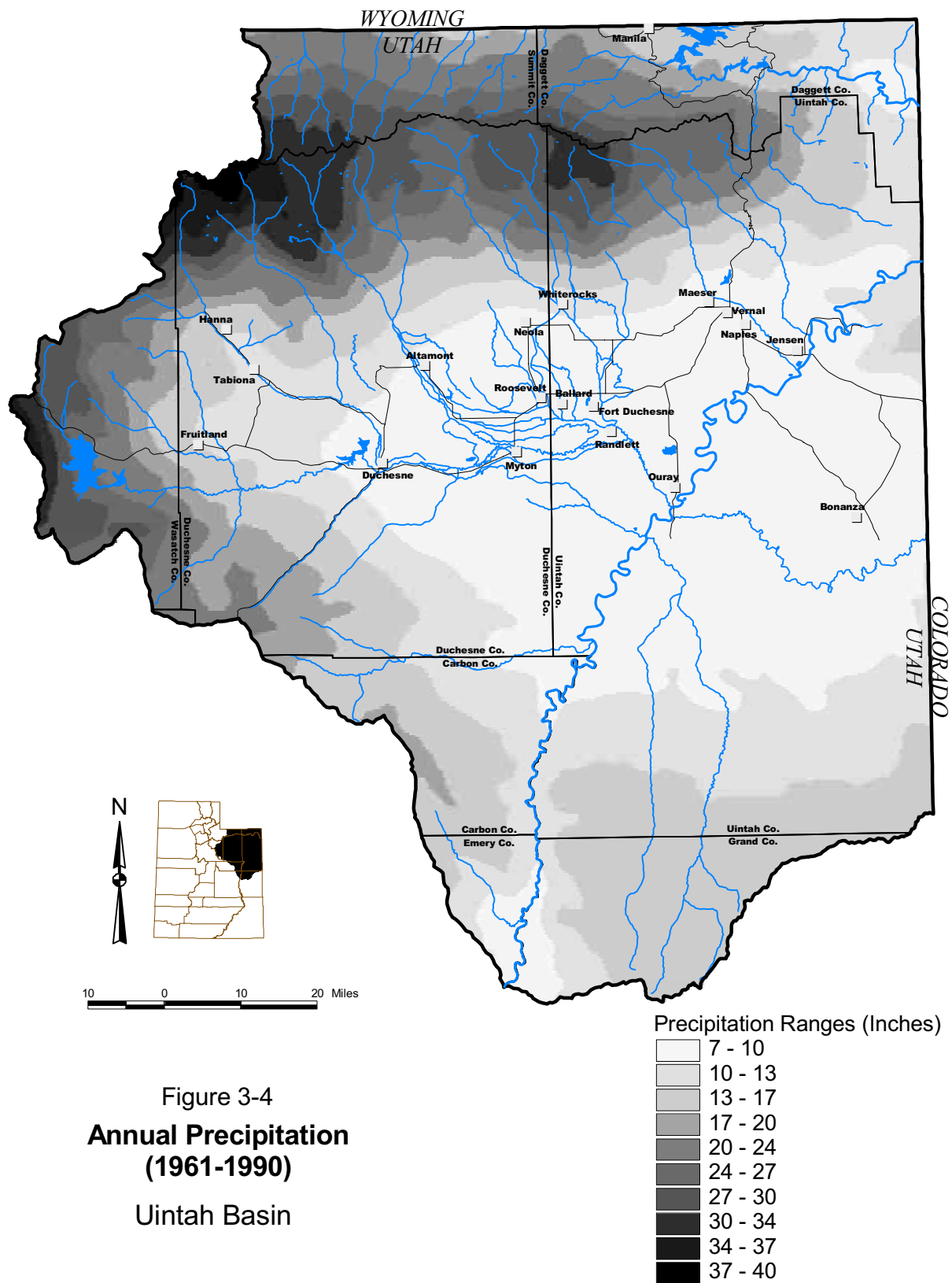


Figure 3-3  
**Climatological Reporting  
 Stations**  
 Uintah Basin



Desolation Canyon is the lower area of the Green sub-unit, with its deep, narrow canyons and many rapids.

### **White Sub-Unit**

The White sub-unit lies east of Ouray and the Green sub-unit and consists of the White River drainage and Evacuation Creek. The area is part of the Tavaputs Plateau and the Sweet Water Canyon. The area is rich in oil shale and gilsonite. The Bonanza Power Plant is located near Bonanza about 40 miles south of Vernal.

Rock structure within the area is relatively simple, with a few degrees north westward tilt (dip) of the strata, flattening toward the northwest. High localized permeabilities in some joints have been measured; however, the joints tend to close with depth with a resulting decrease in permeability. The gilsonite deposits near Bonanza occupy some of the northwest-trending joints and faults.

The Town of Bonanza is the nucleus of gilsonite mining in the United States. Gilsonite, also called Uintaite, is a solid hydrocarbon mineral which occurs in narrow vertical veins throughout the region surrounding the project area. These northwest-southeast veins measure up to seven miles long.

Several oil, gas and oil shale fields exist in the sub-unit. There are major federal oil shale leases in Utah that encompass about 10,000 acres and state leases encompassing 14,000 acres.

Tar sand is found in the sub-unit, primarily in the Green River Formation below the oil shale layers. This sand is estimated to contain seven billion barrels of bitumen.

Soils within the sub-unit are of highly erodible desert-type with moderate to low permeability. With the exception of soils in the floodplains of the White and Green rivers and along drainages, the soils of the sub-unit are shallow to very shallow (less than 20 inches) and are on sloping to steep upland terraces containing many areas of rock outcrops and rock escarpments.

### **Ashley/Brush Sub-Unit**

The Ashley/Brush sub-unit lies northwest of Vernal and Jensen. Ashley and Brush creeks were glaciated only in their upper reaches. Downstream

from the heads of the valleys, broad U-shaped canyons carved by glaciers give way to extremely narrow precipitous gorges cut entirely by running water. Such gorges are greatly influenced in form and character by the particular rock formation into which they are cut. For example, canyons eroded into the Weber sandstone, one of the prime cliff-forming units in the Uinta Mountains have steep vertical faces with high rugged plateaus. Ashley, Brush and Dry Fork creeks owe most of their grandeur to the Weber sandstone.

The Vernal area is located along Ashley Creek in northeastern Utah. The lands begin north of Vernal and extend southeast to the mouth of Ashley Creek. The surface of the area is smooth and gently slopes to the southeast.

The majority of the soil is formed from alluvial sediments that have been transported into the valley from the Uinta Mountains and the surrounding foothills. They are mainly of medium texture and open structure, with moderate permeability, good available moisture capacity, and relatively low in soluble salt and alkalinity. The inherent fertility is high and capable of producing highly sustained yields (Bureau of Reclamation, 1965).

The Jensen area is located in Uintah County. Most of the arable lands are adjacent to the west bank of the Green River in an area that averages two miles in width and extends five miles in length. Small tracts of arable lands also lie in a narrow valley along the banks of Brush Creek. These extend from Red Fleet Reservoir to a point 15 miles downstream where Brush Creek meets the Green River.

Except for the narrow strips of land adjacent to Brush Creek, all arable lands lie on three distinct and successive benches. These benches were formed mainly by erosion and deposition as the Green River channel intermittently changed and deepened. These lands have a moderate slope favorable to efficient irrigation, but they are underlain by the Mancos formation which contains large amounts of alkalinity.

Many of the tracts along Brush Creek are relatively small and often need their own diversion from the creek. The soils of the irrigable lands are predominantly deep, well-drained, heavy clay loams.

These clay loam soils are fertile and predominantly free from excessive amounts of soluble salts (Bureau of Reclamation, 1965).

### **Upper Green Sub-Unit**

The Upper Green sub-unit lies north of the Uinta Mountains and includes all of Daggett County, which includes a section of Diamond Mountain in the northeast corner of the state. The Green River and Flaming Gorge Dam and Reservoir divide the Upper Green sub-basin. Prior to the construction of Flaming Gorge Dam, only two foot bridges crossed the river, one at Linwood and one at Hideout Canyon. State Highway 191 crosses the dam to Dutch John and then continues on to Rock Springs, Wyoming.

The highest point in the Uinta Mountains in Daggett County is Deadman's Peak (elevation 12,280 feet) in the extreme southwest corner of the county. Eastward from here, for 10 miles to Leidy Peak (elevation 12,013), the elevation of the range averages over 11,500 feet with several prominences of more than 12,000 feet. The mountains have abundant surface water, are dotted with lakes, and are thickly forested. Eastward from Leidy Peak to the broad pass where Utah Highway 44 crosses the range at an elevation of 8,500 feet, the Uinta Mountains rapidly lose elevation and become increasingly arid. From the pass eastward, the range breaks up into isolated ridges and irregular rocky prominences that rise above rolling plateau country. The plateau surface is modified by the drainage of Pot Creek, which flows across the plateau to the east into Colorado, and by numerous streams that plunge precipitously into the Green River to the north. At the east end, the barren mountains reveal more of the somber red hue of their ancient quartzite core.

Lucerne Valley, in western Daggett County, is the most populous portion of the country and contains the town of Manila, the county seat. It is a broad, fertile, alluvium-floored valley developed on the soft Mancos Shale. Roughly paralleling the Wyoming-Utah line, a hogback of Tertiary sandstone and conglomerate separates the valley from the arid Green River Basin of Wyoming to the north. To the south, curving hogbacks of successively older

formations rise sharply into the forested foothills of the Uinta Mountains.

The country northeast of the Green River is a continuation of the hogback and broad strike valley pattern of the Lucerne Valley west of the river. Along the Utah-Wyoming line, parallel arcuate hogbacks of Mesaverde sandstone form the feature called "The Glades". To the south of these ridges is Antelope Flats, a continuation of the Mancos Shale strike valley extending west to east. This broad shale-floored valley is constricted by the overriding thrust mass of Goslin Mountain, but it widens again into Clay Basin. Sharply upturned ridges, such as Boar's Tusk and Dutch John Ridge, occur south of Antelope Flats. These ridges are pushed up against and under the great Uinta fault. The country is arid and sparsely vegetated, and the streams are intermittent.

Browns Park, in easternmost Daggett County, is a picturesque, fertile, gravel-floored valley surrounded by somber mountains and plateaus. The Green River issues from Red Canyon into the park from the west and flows out to the south through the slot-like north opening of Lodore Canyon in Colorado. The lowest elevation in Daggett County (5,380 feet) is on the Green River at the Colorado state line.

Geologically, the basin contains rocks of many ages, ranging from Precambrian to Quaternary. Figure 3-5 shows a general geology map of the basin, and Figure 3-6 shows a stratigraphic section of the Uinta Mountains along Highway 191 from Vernal to Manila. Table 3-2 shows the areas of each of the generalized geologic units.

The Uinta Mountains are an anticlinal fold, so the oldest formations form the core of the mountains. Progressively younger formations occur outward from the center.

The Pleistocene deposits are mainly terrace, pediment gravels and glacial outwash from the Uinta Mountains. These deposits are non-saline. In the central part of the basin from Rock Creek east to LaPoint, they overlie the Duchesne River formation.

The Duchesne River formation (of late Tertiary age) consists of interbedded red, brown and vari-colored clay shales, gray-to-buff red-weathering

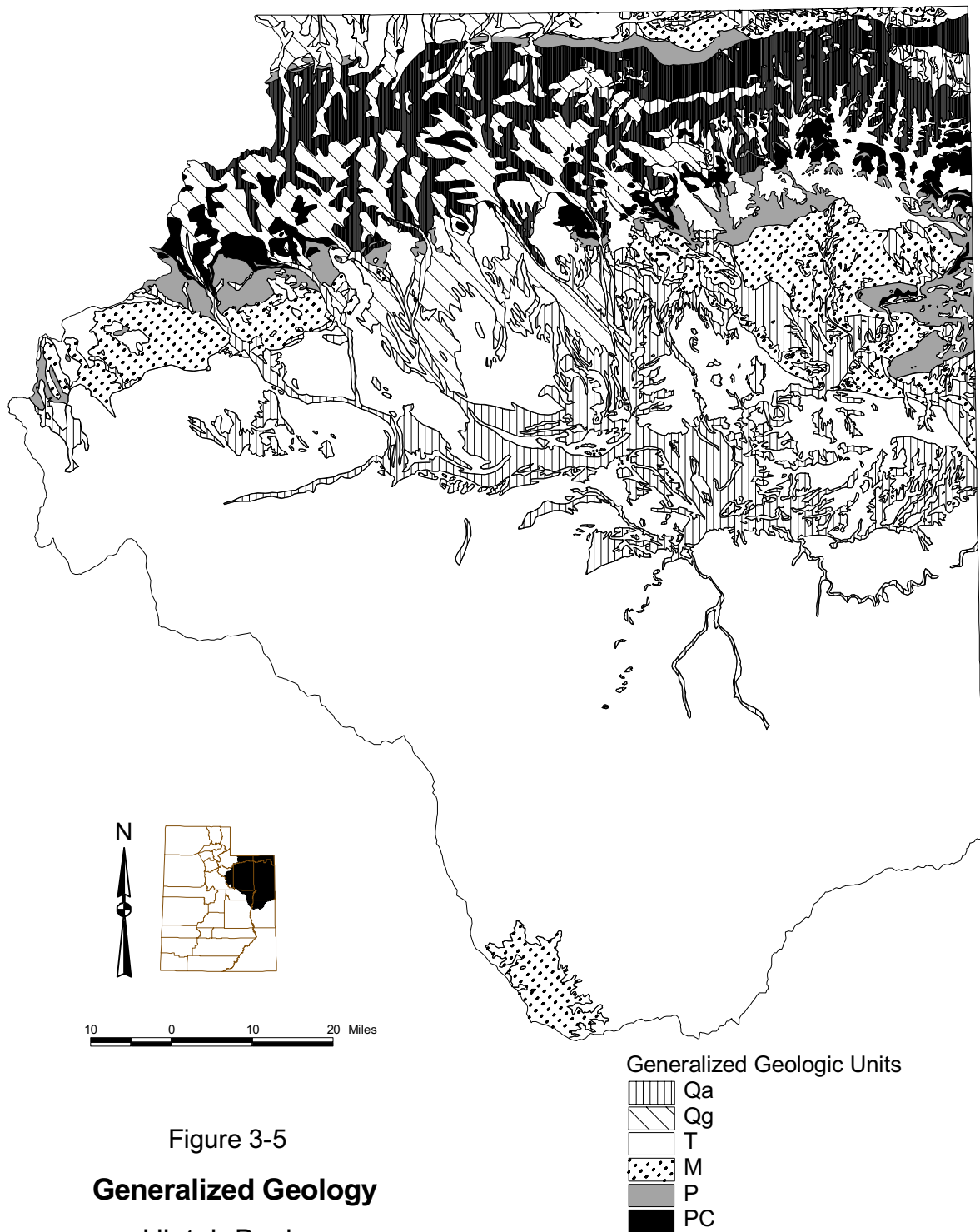
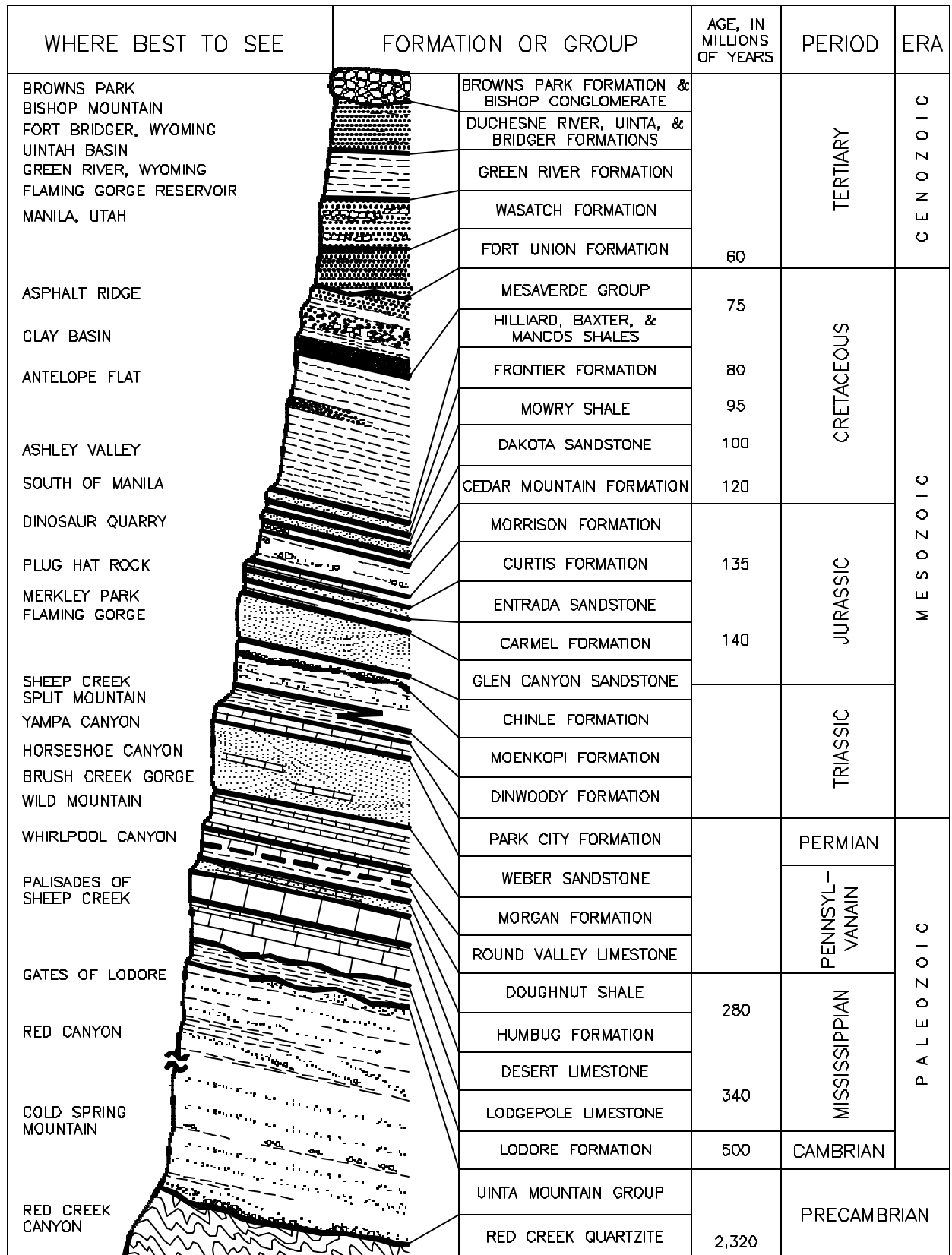


Figure 3-5  
**Generalized Geology**  
 Uintah Basin

Descriptions are on following page

Figure 3-6  
**UINTA MOUNTAIN STRATIGRAPHIC SECTION**



SOURCE: GEOLOGICAL SURVEY BULLETIN 1291

## **Uintah Basin** **Generalized Geologic Units**

### Quaternary

- Qa      Unconsolidated deposits of alluvium, colluvium, windblown and landslide origin.
- Qg      Unconsolidated deposits of glacial origin.

### Tertiary

- T      Weakly to semi-consolidated sedimentary basin-filling rocks of the Browns Park, Bishop Conglomerate, Duchesne River, Uinta, Bridger, Green River and Flagstaff formations.

### Mesozoic

- M      Consolidated sedimentary rocks locally include the North Horn, Current Creek, Mesa Verde Group, Mancos Shale, Frontier Sandstone, Mowry Shale, Dakota, Cedar Mountain, Morrison, Curtis, Entrada, Carmel, Nugget (Navajo), Chinle, Moenkopi and Dinwoody Formations.

### Paleozoic

- P      Consolidated sedimentary rocks locally include the following formations: Park City, Weber Sandstone, Morgan, Round Valley Limestone, Doughnut Shale, Humbug, Deseret Limestone, Madison Limestone, Maxfield Limestone and Lodore Sandstone.

### Precambrian

- Pc      Consolidated sedimentary and metamorphic rocks locally include the following: Red Pine Shale, Uinta Mountain Group and Red Creek Quartzite.

<p><b>Table 3-2</b></p> <p><b>General Geology</b></p> <p><b>Uintah Basin</b></p>	
Generalized Geologic Units	Total Areas
Quaternary	1,405,380
Tertiary	4,124,500
Mesozoic	465,200
Paleozoic	221,010
Pre-Cambrian	753,510
Totals	6,969,600
Source: Geology data from USGS.	

sandstones, and some conglomerates of fluvial origin derived chiefly from the Uinta Mountain area. Typically not a saline formation, it is a low salt producer. This formation occupies the upper elevations of the south slope of the Uinta Mountains.

The Uinta formation underlies the Duchesne River formation and occupies the central and southern part of the basin. The Uinta formation is composed mainly of gray or green, saline and gypsiferous clays, shales, sandstones and marlstone. This formation is the predominate salt producer in the Uintah Basin.

The Green River formation occurs in the southern part of the basin and consists of sandstone, siltstone, shale and limestone. This formation includes oil, gas, and oil shale deposits and is high in salt content.

The Mesaverde Group of Cretaceous Age is limited in extent. It is exposed west of Vernal and includes Asphalt Ridge. It consists of white, gray and yellow-buff marine sandstones with occasional shale tongues. The formation is rich in commercial bituminous sandstone. Water from petroleum-producing wells in this formation is very saline.

The Mancos Shale formation is Cretaceous in age and exposed mainly in Ashley Valley. This formation is composed of dark gray, saline and gypsiferous clay shales. Infiltration of precipitation is virtually non-existent because of the clay shales. Any water that issues from the formation is saline.

#### **3.3.4 Soil and Land Use**

The basin contains approximately 6,969,600 acres of which 201,120 acres are agricultural and 18,170 acres are in residential and industrial. The rest is in forest, range, riparian and wetlands. Table 3-3 shows vegetative cover and land use for each of the five sub-units.

The basin's soils are mostly formed in alluvium from mixed sedimentary rocks on foothills, mountain slopes and alluvial fans. Most are well-drained, but some are poorly-drained and used mostly for summer pastures.

#### **3.3.5 Land Status**

Federally administered land is under the jurisdiction of six agencies: the Forest Service

(USFS), Bureau of Land Management (BLM), National Park Service (NPS), Fish and Wildlife Service (FWS), Bureau of Indian Affairs (BIA), and the Bureau of Reclamation (BR). They administer about 58 percent of the basin lands. Eight percent is administered by state government, 15 percent is Indian land held in trust by DOI for the Ute Indian Tribe, and 19 percent is private land. Land status is shown in Table 3-4, along with acreage in each sub-unit.

### **3.4 Water-Related History**

The first white men to visit the area came with the Dominguez Escalante Expedition in 1776. Led by Catholic priests, the purpose of the journey was to find a new route from Santa Fe to California. Journal entries tell of the group reaching the present site of Strawberry Reservoir and descending by way of Sixth Water Creek into Diamond Fork, the Spanish Fork River and eventually to Utah Lake. This is the route by which present day CUP water reaches the Wasatch Front. Escalante's expedition was followed by the fur trappers in the early 1800s. The first of these was William Henry Ashley, for whom Ashley Valley is named.

#### **3.4.1 Early Water Development**

The Uintah and Ouray Indian Reservation was established by executive order of President Lincoln on October 3, 1861. Between 1902 and 1905, reservation lands were allotted to individual Indians and the unallotted lands returned to the public domain. As a result, Indian and non-Indian lands are interspersed. Many of the present administrative and water rights issues had their beginnings in the homesteading of the Indian reservation.

In 1905 the U. S. Government opened the lands for homesteading. In that year, the first non-Indian settlers arrived in the Duchesne River area. That same year, two irrigation groups filed for water rights in the Duchesne area.

The first irrigation systems were relatively small projects constructed with horse-drawn plows and scrapers. Larger and longer canals were constructed as the demand for land and water grew. The first water was diverted from the basin in 1869. Three canals diverted water from the Strawberry

Table 3-3 Vegetative Cover and Land Use						
Vegetative Cover	Upper Green River	Ashley/ Brush Creek	Duchesne/ Strawberry River	Green River	White River	Total
				(acres)		
Agriculture	17,860	27,680	143,610	10,940	1,030	201,120
Residential/Industrial	1,110	7,190	9,430	360	80	18,170
Idle	10,950	7,090	113,840	40,850	24,640	197,370
Wet/Open	18,740	3,080	32,020	6,710	1,260	61,810
Riparian	960	1,060	23,130	5,040	2,440	32,630
Salt Desert	3,700	57,720	166,890	667,010	329,720	1,225,040
Blackbrush	0	0	0	2,820	0	2,820
Sage/Grass	251,430	118,090	604,970	529,300	222,140	1,725,930
Grassland	19,010	2,350	83,540	38,780	1,430	145,110
Pinyon/Juniper	107,640	35,790	437,970	784,220	185,970	1,551,590
Oak	2,840	0	7,630	168,160	42,740	221,370
Mountain Shrub	270	590	15,900	1,970	0	18,730
Aspen	7,990	6,100	231,500	46,340	0	291,930
Mixed Conifer/Aspen/Shrub	1,570	800	23,790	34,120	6,120	66,400
Conifer Forest	378,210	147,540	468,810	97,140	1,670	1,093,370
Alpine	37,480	6,640	72,090	0	0	116,210
Totals	859,760	421,720	2,435,120	2,433,760	819,240	6,969,600
Source: Utah State University GAP/EPA, 1995.						

<p><b>Table 3-4</b> <b>Basin Land Ownership And Administration</b></p>							
Land Owner	Upper Green River	Ashley/ Brush Creek	Duchesne/ Strawberry River	Green River	White River	Total Uintah Basin	Total (per- cent)
	(acres)						
Forest Service	459,870	205,250	1,028,280	16,370	0	1,709,770	25
Private	113,330	87,740	791,220	276,810	61,190	1,330,290	19
Bureau of Land Management	154,120	106,280	69,310	1,300,020	555,670	2,185,400	31
State Lands	55,020	22,070	112,640	290,630	107,180	587,540	8
National Parks/Monuments Recreation/Wildlife Areas	77,410	390	10	57,830	0	135,640	2
Indian Reservation	0	0	482,930	492,110	45,920	1,020,960	15
Totals	859,750	421,730	2,484,390	2,433,770	769,960	6,969,600	100
Source: Utah State University, Geography Department, 1996.							

River drainage to Daniels Creek. Two of these canals, Strawberry River Canal and Willow Creek Canal, were commingled in 1954 to form a single canal. Hobble Creek Ditch is the third diversion. These diversions ceased when water was replaced from the Jordanelle Reservoir under the Central Utah Project.

From the beginning of settlement in the early 1900s, irrigation has been needed to sustain agriculture. However, while arid in climate, the Uinta Mountains actually receive an abundant supply of precipitation. The annual flow of most streams from the Uinta Mountains exceeds the local demand. Most of this flow, however, occurs as uncontrolled spring runoff. As summer progresses, the supplies diminish below the requirements of the crops.

Since early days, attempts have been made to store a part of the spring excess for use in late summer. These efforts include the construction of Moon Lake Reservoir, the enlargement of many of the high mountain lakes, and the construction of Midview (Lake Boreham) and Big Sand Wash reservoirs. Together with many smaller private and Indian reservoirs, these facilities have provided valuable but still insufficient storage of the surplus spring runoff.

Water rights filings were made in the State Engineer's Office in 1905 for two areas in the Duchesne area. The first filing was the Holgate or Pioneer Ditch, which diverts from the Duchesne River some six and one-half miles east of Duchesne. This water irrigated some land before reaching the Holgate Flat, later called Midview. The second filing was for the area under the Rocky Point Ditch Company. This canal diverts water from the north side of the Duchesne River at a point five miles north of Duchesne and irrigates land above and east of Duchesne as far as the Holfeltz Ranch almost nine miles down the river. There were 22 water right filings for this ditch, and construction began early in the summer of 1906. It was 1909 before the ditch was in satisfactory operating condition.

Water for the town of Duchesne was diverted into a ditch on the Duchesne River about one-half mile above the town in 1905. In 1917 the city of Duchesne constructed a new water system. This system had a cistern, or storage supply, on Blue

Bench north of town to give the necessary pressure, with the water supply being taken out of the Rocky Point Ditch.

The Myton area was opened for homestead entry in September 1905, and a price of \$1.25 per acre was charged for the land. An Indian trading post had been established near the present Myton townsite and was called "the Bridge," since it was near the only bridge that spanned the Duchesne River. The post gradually expanded into a town that was given the name of Myton in honor of H. P. Myton, who was at one time in charge of Indian affairs on the reservation.

Hanna and Tabiona, two small farming communities on the upper Duchesne River, were both established in the fall of 1905. Tabiona was named after Chief Tabby who was the chief of a large local Indian tribe. Hanna received its name from early colonizers known by that name. Immediately after the area was settled, small irrigation ditches were dug to divert water from the Duchesne River and its tributaries onto the parched soil. It was evident to the homesteaders that irrigation water was essential to successful agriculture.

Construction of high mountain dams began in the spring of 1917 in the Brown Duck drainage with construction of Brown Duck, Island and Kidney Lake dams by the Farnsworth Canal and Reservoir Company. The Dry Gulch Irrigation Company later constructed Clement Dam in Clement Basin.

During the 1910s and 1920s, 10 more dams were constructed in the Yellowstone (Garfield) and Swift Creek basins by Farmers Irrigation Company and a private dam (Milk Lake) by Chester Hartman. A total of 14 dams were completed for a total storage of 4,600 acre-feet.

The Indian Irrigation Service became alarmed with reduced flows in Lake Fork and Yellowstone rivers, due to upstream diversions. A 1923 federal court decree (Dockets 4427 and 4418) gave the Uintah Indian Irrigation Project lands the first priority to water. Thus the percolating waters feeding the streams could not be diminished because the Uintah Indian Irrigation Project had first water rights. Through negotiation between the irrigation companies and the Uintah Indian Irrigation Project, three acre-feet per acre of irrigation water was

apportioned for each acre of Indian irrigated land. Secondary water rights also received three acre-feet of water for each acre of irrigated land, as long as there was water in the stream.

In dry years, only the first water rights could be filled. As a remedy, the Farnsworth Canal and Reservoir Company constructed Twin Pots Dam; and later in 1937 the Bureau of Reclamation constructed Moon Lake Dam and Reservoir. The two reservoirs provide storage of surplus water and allow for more efficient use of irrigation water.

The city of Roosevelt, founded in 1906, is situated on the lower extremity of a fertile mesa seven miles west of the Uinta River. The east and west branches of Dry Gulch Creek form a junction at the foot of this tableland, and it drains the valley surrounding the city.

At the time of settlement, all the people in and around Roosevelt hauled their culinary water in barrels from a spring southwest of town. The citizens of the community later stored the waters of the Uinta River in a tank at the highest point on the bench, from which the water was conveyed through the streets in wooden pipes. On November 17, 1915, the city council decided to drill a well near the reservoir site. Since then, other wells have been drilled east of the town of Neola and water has been pumped into the reservoir.

Domestic water was supplied to Vernal and adjoining communities from Ashley Spring on Ashley Creek just above Utah Power's hydroelectric power plant. A steel pipe, with a capacity of seven cfs, conveyed water to the head works of the distribution system. Many farmers hauled their culinary water, and a few obtained it from irrigation ditches.

Ashley Creek is characterized by high discharges from snowmelt in May and June followed by rapidly receding flows that fall far below irrigation requirements. As early as 1888, efforts were made to develop storage for the erratic water supply. To date, there is 41,500 acre-feet of storage capacity available on Ashley Creek. This is provided in a group of small glacial lakes (Long Park, Twin and Goose lakes) on the headwaters of Ashley Creek (1,100 acre-feet) and Steinaker Reservoir with 40,400 acre-feet. An additional 5,740 acre-feet of capacity is provided for the Vernal

area in Oaks Park Reservoir on Brush Creek, which lies north of Ashley Creek. Water is conveyed by the Oaks Park Canal from the reservoir to Ashley Creek. Municipal and industrial water (18,000 acre-feet) can be imported from Brush Creek via Red Fleet Reservoir and the Tyzack Aqueduct.

Presently irrigated lands in the Vernal area are served by six major canals and ditches that divert flow from Ashley Creek. These include the Ashley Upper, Ashley Central, High Line and Rock Point canals and the Island and Dodds ditches. In addition to the diversions by the main canals and ditches, some small diversions are made by individuals or small groups of private interests. In the southern portion of Ashley Valley, the Union and River canals supply some small areas at times of high water flows from Ashley Creek and return flows from irrigated lands.

The Nine Mile area is located south of Roosevelt and Vernal and drains the West Tavaputs Plateau. The main farming activity in this area is cattle. One of the few real cattle kings of the west was Preston Nutter, whose business centered around Nine Mile. Because of the narrow canyons and sparse vegetative cover, the land is always susceptible to flash floods, especially in late summer.

Much like Nine Mile, the main industry of Manila is cattle. From the time of the first settlement, water has been a problem. For culinary use, the town built a cistern and dug a tunnel to collect the seepage from a strata of shale north of the town. This water was piped from the cistern into the town. This pipe supplied a 2,000 gallon tank located in town. From this tank, the townspeople obtained their culinary water and watered their livestock. The system has been continually upgraded over the years, and culinary water is now piped from Long Park Reservoir to a filtration plant and then on to Manila.

### **3.4.2 Federal Water Projects**

The Uintah Indian Irrigation Project, constructed by the Bureau of Indian Affairs (BIA), was started in 1906 and completed in 1920. The project, constructed with 21 canals and laterals, is much the same today. The BIA manages, operates and maintains the canals and laterals. Irrigation water is delivered to the users through this system.

The Strawberry Valley Project, which diverts water from the Uintah Basin to the Bonneville Basin (Utah Valley sub-area in the Utah Lake drainage area), was one of the earliest federal reclamation developments. Construction began in 1906, and water was first used in 1915. Water was collected in the 270,000 acre-feet of active storage capacity in Strawberry Reservoir which was formed by a dam on the Strawberry River, a tributary of the Duchesne River. Additional water was brought to the reservoir from Indian and Currant creeks through feeder canals. The Strawberry (Syr) Tunnel, which is 3.7 miles long, extends from the reservoir to Sixth Water Creek which is tributary to Diamond Fork and thence the Spanish Fork River. Released storage water is re-diverted from the Spanish Fork River and used for irrigation primarily in Southern Utah Valley. A small amount of the stored water was conveyed to Goshen Valley.

The construction of Moon Lake Dam was completed under the Moon Lake Project (Bureau of Reclamation) in late 1937. The earthfill dam is located approximately 13 miles northwest of the community of Mountain Home and stores water from Lake Fork River which is tributary to the Duchesne River. The active capacity of the reservoir is 35,760 acre-feet, while the dead storage is an additional 13,740 acre-feet. The Yellowstone Feeder Canal, Midview Dam (Lake Boreham) and the Midview Canal System were also part of the Moon Lake Project. The water stored in these reservoirs is released for irrigation on lands under the Moon Lake Water Users Association and Uintah Indian irrigation projects. The natural flow the Indians are entitled to is passed through the reservoir. These lands irrigated by this project are located in the vicinity of Roosevelt.

Water is exported through the Duchesne Tunnel as part of the Provo River Project, from the North Fork of the Duchesne River, a tributary of the Green River and eventually the Colorado River. The tunnel begins 21 miles due east of Kamas and extends six miles under a spur of the Uinta Mountains. The outlet is into the main stem of the Provo River (Utah Lake drainage area), upstream from Heber City. The Duchesne Tunnel was completed in 1953 and began delivering water for the 1954 irrigation season. Its maximum capacity is 600 cubic feet per second

(cfs). In the North Fork of the Duchesne River, at the point of diversion, over 70 percent of the annual flow occurs during May and June. The tunnel usually begins transporting large quantities of water in early May. The average annual diversion has been about 22,300 acre-feet.

Construction of the Vernal Unit, which is a portion of the initial phase of the Central Utah Project, was initiated during 1959 and completed in 1962. The principal feature of the project is Steinaker Dam, located in Steinaker Draw four miles north of Vernal. The earthfill dam is 140 feet high and impounds 37,200 acre-feet, of which 33,280 acre-feet is usable. Water is diverted from Ashley Creek at the Fort Thornburgh Diversion Dam into the 400 cfs Steinaker Feeder Canal and then into Steinaker Reservoir. The 300 cfs Steinaker service canal conveys the flows from the outlet works of Steinaker Dam throughout Ashley Valley, with water being released to agricultural lands at numerous points along the canal.

The Colorado River Salinity Control Program was started in 1980.<sup>106,95</sup> This program provides financial and technical assistance to identify salt source areas in the Colorado River Basin and to install conservation practices to reduce salinity levels in the Colorado River. The Salinity Control Program in the Duchesne River drainage has treated about 90,000 acres at a cost of \$41 million (1997), and it has reduced the salt load in the Colorado River by about 92,000 tons per year. The original goal of the Salinity Control Program was to treat 137,000 acres and to reduce the salt load by 111,000 tons per year. Funding for the project has been reduced, but the goal is still obtainable.

Flaming Gorge Dam is located on the Green River in northeastern Utah about 32 miles downstream from the Utah-Wyoming border. The reservoir formed by the dam extends up the Green River to a point near Green River, Wyoming. The dam was completed in 1962 and began storing water on November 1 of that year. The active capacity of the reservoir is 3,516,000 acre-feet, and the dead storage is an additional 273,000 acre-feet.

Flaming Gorge Dam and Reservoir have multi-purpose objectives. As part of the Colorado River Storage Project, they are part of a long-range basinwide program to develop the water resources of

the Upper Colorado River System, regulate the flows of the Green River, and produce hydroelectric power for financing the basinwide water resources program of the Upper Colorado River System.

Starvation Dam, which is part of the U. S. Bureau of Reclamation Bonneville Unit of the Central Utah Project, was completed in 1970. This structure stores high runoff water from the Strawberry and Duchesne rivers, provides supplemental late season storage, and will also provide replacement water for cropland along the Duchesne River in exchange for Bonneville Unit water that is exported to the Wasatch Front.

Upper Stillwater and Currant Creek reservoirs were completed in 1987 and 1977, respectively. These reservoirs store and regulate water from Rock Creek and Currant Creek drainages, respectively. The Strawberry Aqueduct collects runoff from these reservoirs and the south slope of the Uinta Mountains west of Rock Creek or between these reservoirs and conveys the water to the enlarged Strawberry Reservoir for storage and export to the Wasatch Front. The Strawberry Reservoir enlargement was completed in 1974 and filled for the first time in 1998.

### **3.4.3 Water Districts**

Most of the land within the Uintah Basin study area is within the boundaries of the Central Utah Water Conservancy District. The Uintah Water Conservancy District, established in 1956, includes all of Uintah County, except a small area known as the Moon Lake Exclusion in western Uintah County. Duchesne County organized the Duchesne County Water Conservancy District in 1998. □